# Brock Science Mentorship Seminar

Ian Gordon, Teaching & Learning Librarian

Brock University

Brock University Library

# Brock Science Mentorship Seminar

## Agenda

- Library Virtual Tour – things to know
- What is your research question?
- Identifying your appropriate library research guide(s)
- Search strategies and keywords
- Databases, lots of them
- Citing articles and books using Zotero / zoterobib
- Where to get help

- Homework!

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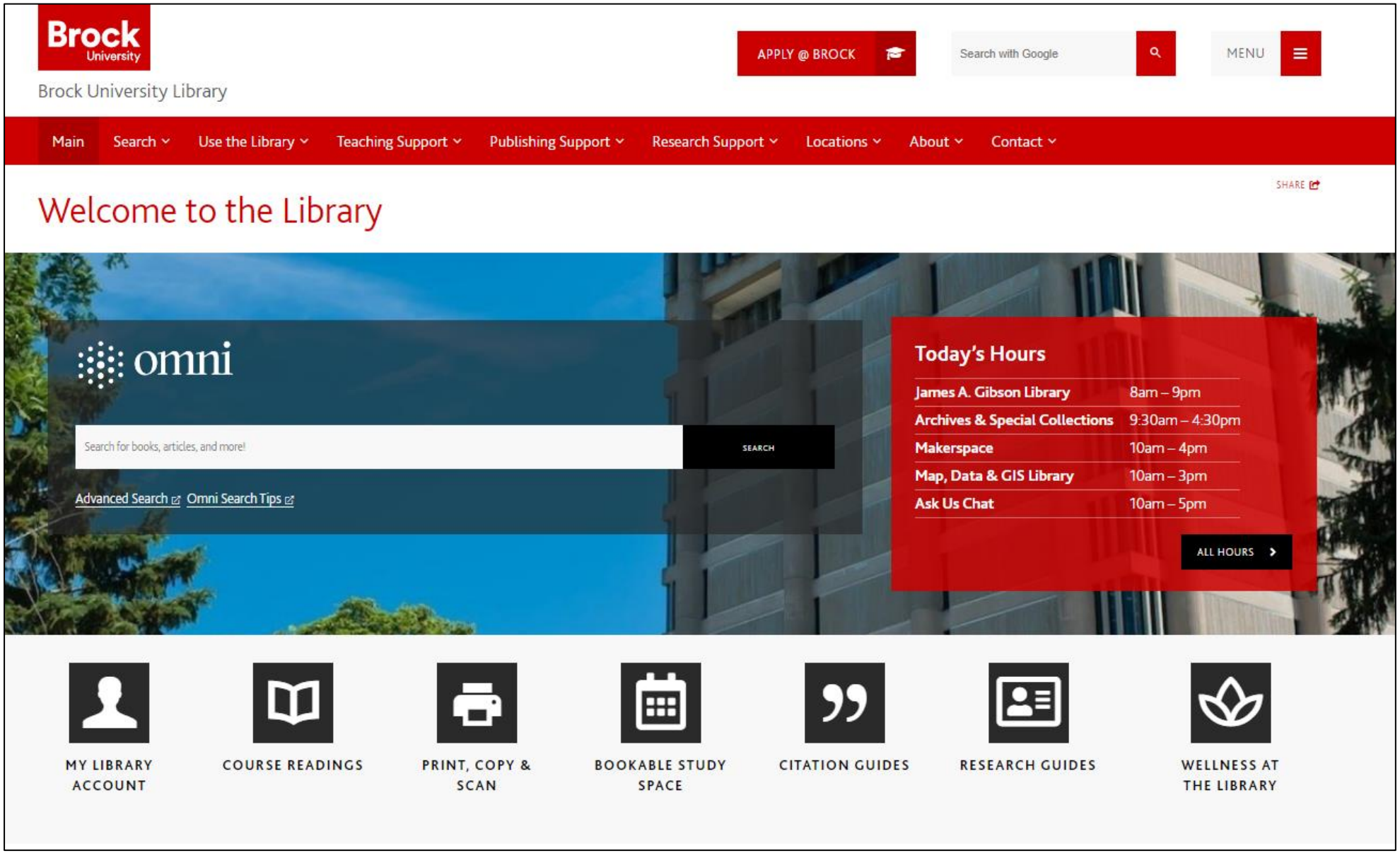
https://brocku.ca/library/



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# Off-Campus Access to Library Resources

Most of our e-journals and e-books are licensed for use by current Brock students, instructors and staff. By logging in to our *proxy* system, you get access to scholarly research, and we ensure compliance with publisher terms and conditions.

**Choose your user type and follow the instructions below. For additional help, please email us at libhelp@brocku.ca.**

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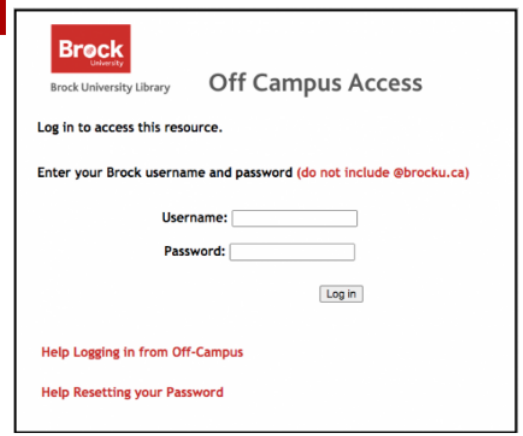
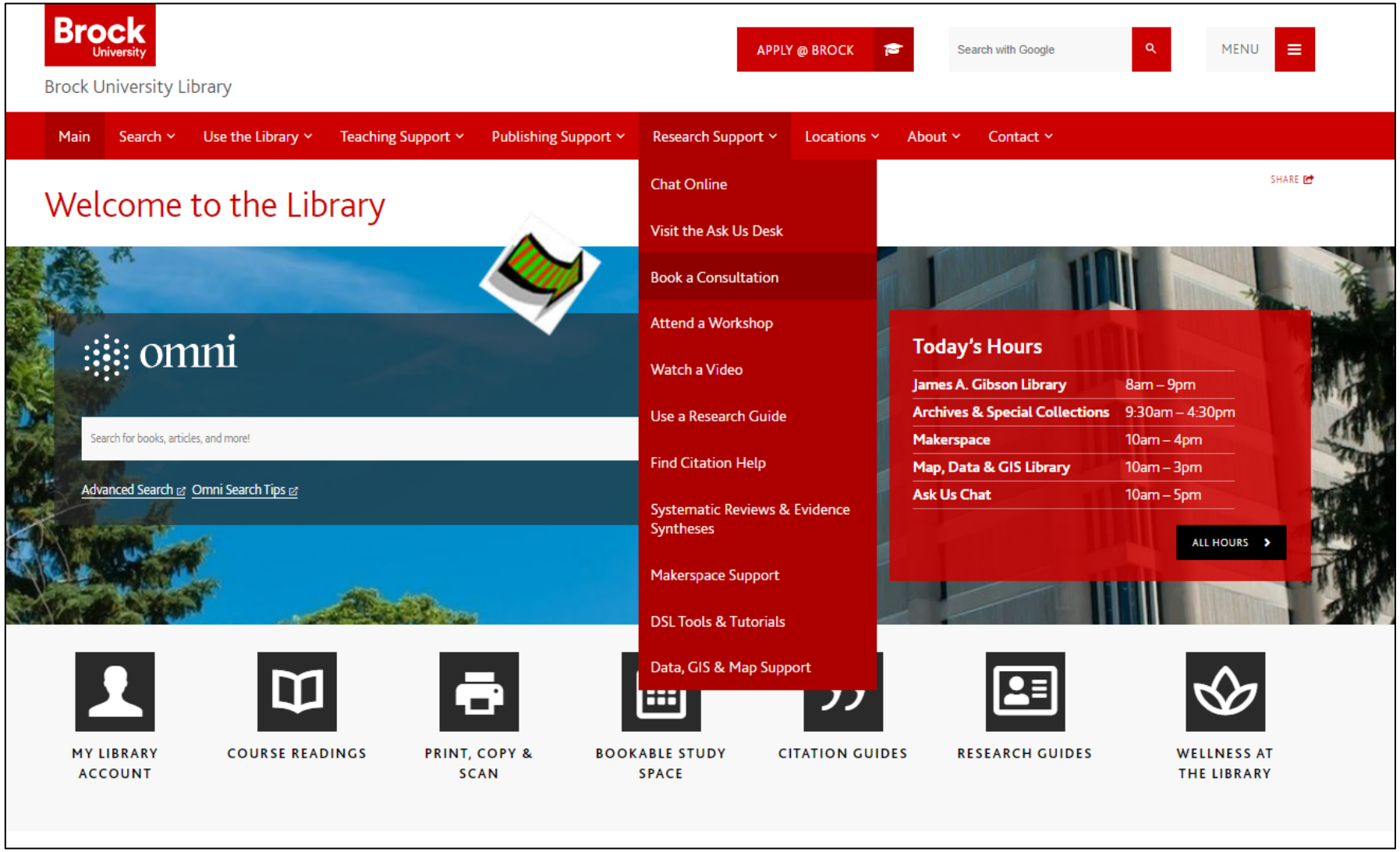
Log-in to our off-campus proxy server at the beginning of your research.

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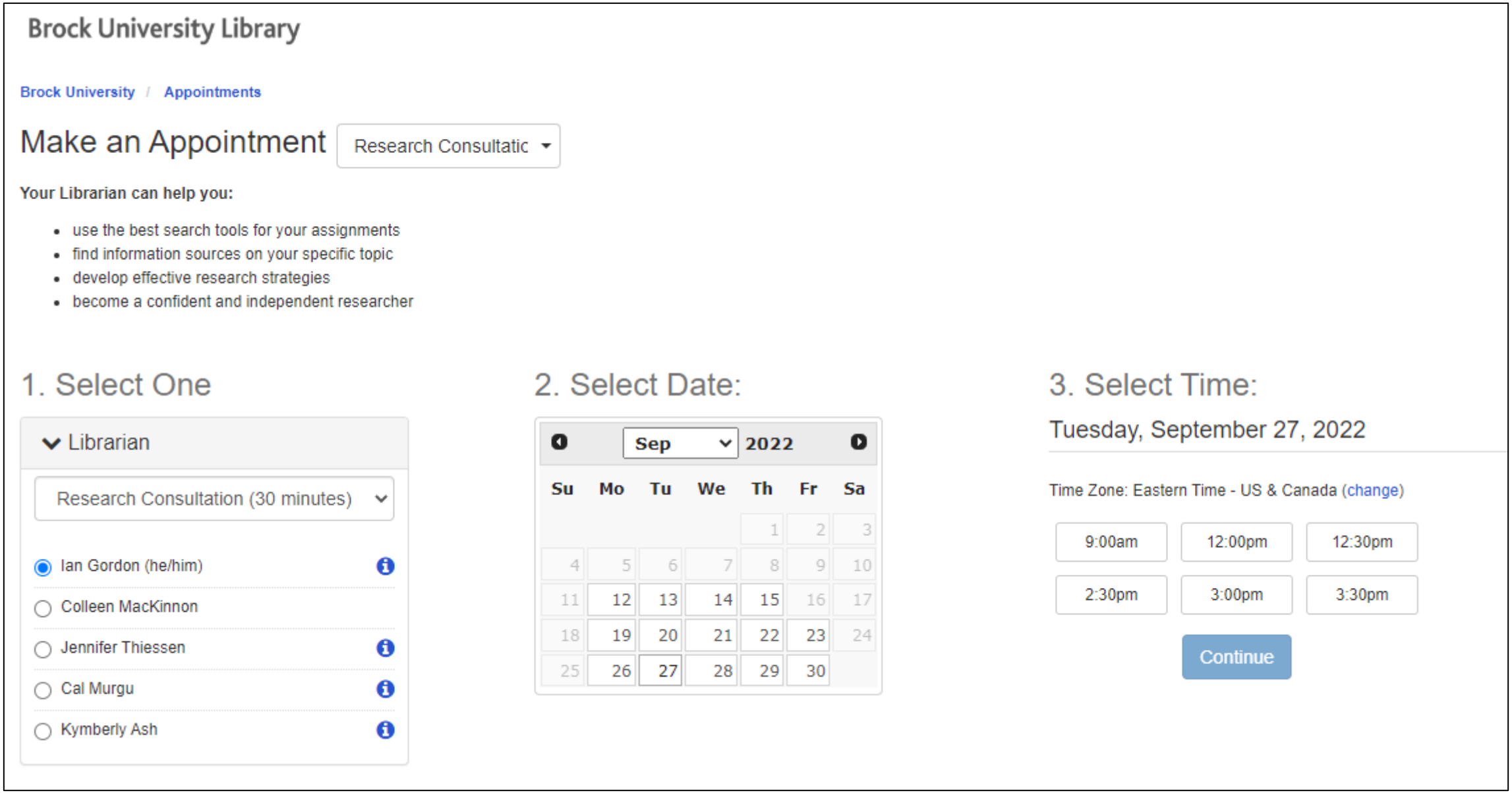
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become a confident and independent researcher
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Ian Gordon (he/him)
Colleen MacKinnon
Jennifer Thiessen
Cal Murgu
Kymberly Ash
2. Select Date:
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2022
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18 19 20 21 22 23 24
25 26 27 28 29 30
3. Select Time:
Tuesday, September 27, 2022
Time Zone: Eastern Time - US & Canada (change)
9:00am
12:00pm
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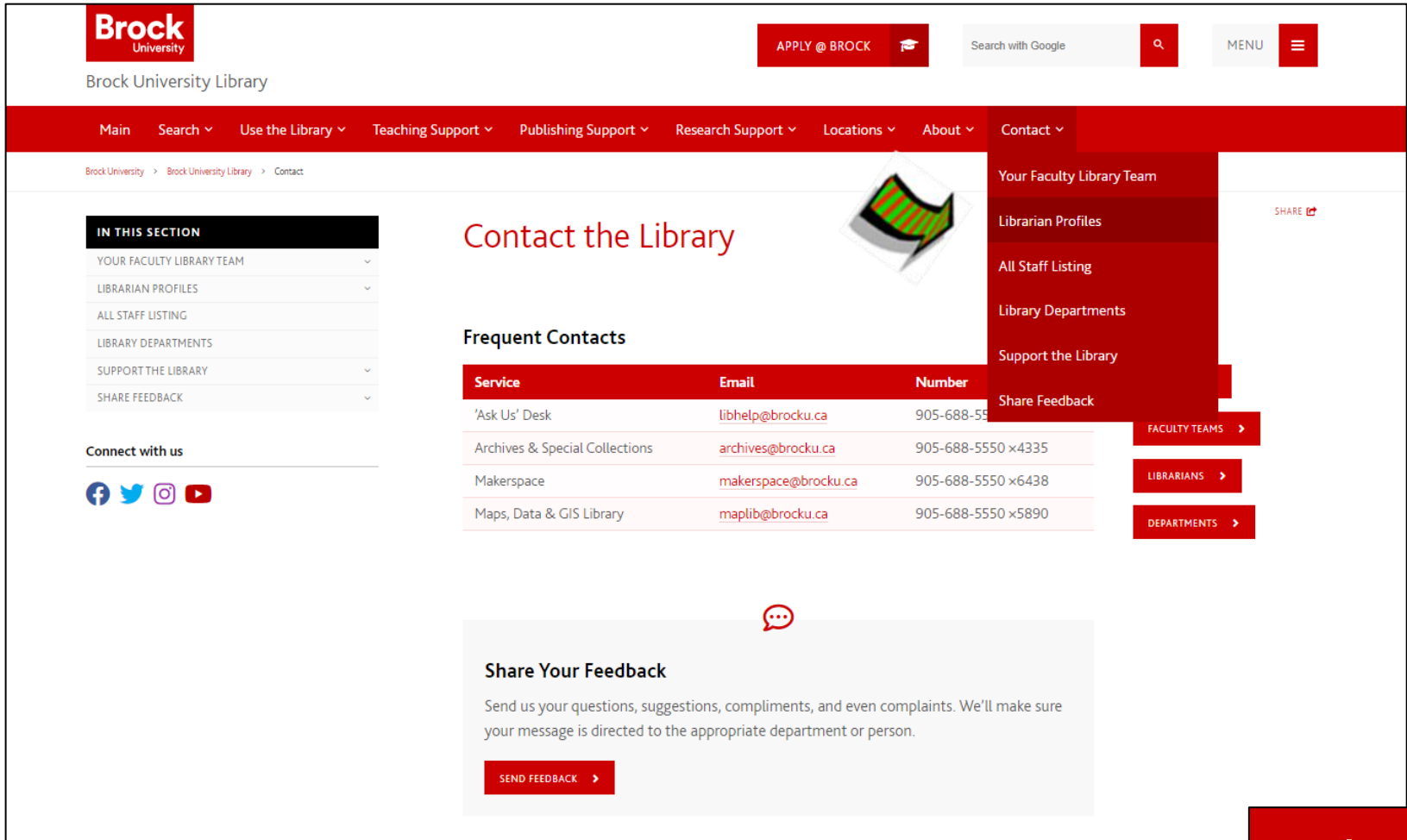
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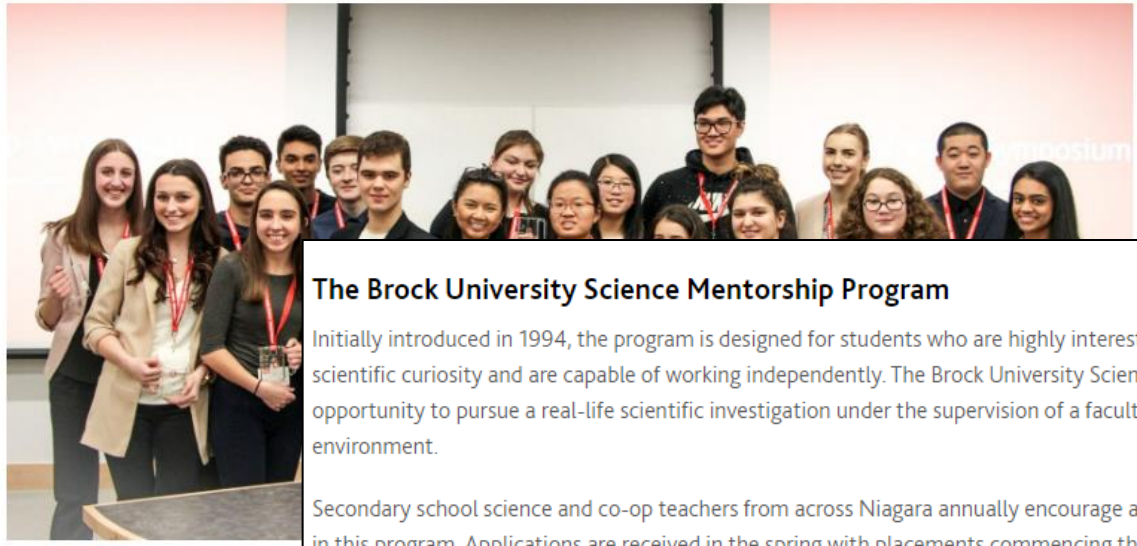
GRAMSS

# Faculty of Mathematics and Science Mentorship Program



This unique program lin
and Science mentors fr

## The Brock University Science Mentorship Program

Initially introduced in 1994, the program is designed for students who are highly interested in science, demonstrate significant scientific curiosity and are capable of working independently. The Brock University Science Mentorship Program offers the opportunity to pursue a real-life scientific investigation under the supervision of a faculty or staff member in a university laboratory environment.

Secondary school science and co-op teachers from across Niagara annually encourage and nominate gifted students to participate in this program. Applications are received in the spring with placements commencing the following fall semester of the secondary school year. Students are matched with mentors who are conducting research in subject areas that are of interest to the student. The supervising secondary school teacher maintains a continual dialogue with the student and periodically meets with the mentor. The primary goal of this program is to encourage these mentored students to consider a career in the sciences. This one-on-one commitment by Brock Faculty of Mathematics and Science faculty and staff is truly an exceptional opportunity.

2020 Mentorship Symposium Program
2019 Mentorship Symposium Program


Brock Digital Repository https://dr.library.brocku.ca/handle/10464/14793

What is your research question?

How successful are chemists, mathematicians, and physicists in keeping up to date with news and scholarly information in their field of study?

SCIENCE & TECHNOLOGY LIBRARIES
2018, VOL. 37, NO. 2, 130–151
https://doi.org/10.1080/0194262X.2018.1445063



# Information Seeking Behaviors, Attitudes, and Choices of Academic Chemists

Ian D. Gordon [a], Patricia Meindl[b], Michael White[c], and Kathy Szigeti[d]

[a]James A. Gibson Library, Brock University, St. Catharines, Ontario, Canada; [b]A.D. Allen Chemistry Library, University of Toronto, Toronto, Ontario, Canada; [c]Engineering & Science Library, Queen's University, Kingston, Ontario, Canada; [d]Davis Centre Library, University of Waterloo, Waterloo, Ontario, Canada

**ABSTRACT**

Chemists in academic institutions utilize a variety of resources and strategies to remain current and to track scholarly information, patents, and news. To explore how chemists in academic institutions remain current, librarians at four Canadian university institutions surveyed 231 and interviewed 14 chemistry faculty, staff, and graduate students on their information seeking behaviors and attitudes. According to survey results, a minority of chemists (13.9 percent) acknowledged that they were successfully keeping up to date, while 50.6 percent indicated that they were somewhat successful. However, a significant number of chemists (35.5 percent) indicated that they were unsuccessful and could do better in remaining current with information. Investigators analyzing focus group data identified three emergent themes related to remaining current: (1) there is "too much information – and not enough time." No single information seeking strategy works; (2) "patents are important – but messy." Chemists find themselves largely suspicious about the value and credibility of patents; and (3) chemists "could do better" in keeping up to date with new and emerging technologies. Chemists continue to be open to new tools and resources yet readily acknowledge that they are too often not sure which information seeking behaviors, resources, or strategies work best. This study helps to shed light on opportunities to identify and meet chemists' evolving information needs.

**KEYWORDS**

Academic (university) libraries; chemists; faculty; graduate students; information needs; information seeking behaviors; information sources

## Introduction

Recent advances in technology have enabled chemists to efficiently acquire and evaluate chemistry information in a timely and sustainable manner. Even so, many chemists continue to struggle to find the right balance of strategies and resources to stay on top of the literature. These concerns raise questions about chemists' information seeking behaviors, attitudes, and choices while attempting to remain current in their areas of expertise. This paper explores academic chemists' practices and feelings when seeking, evaluating, and managing

**CONTACT** Ian D. Gordon igordon@brocku.ca James A. Gibson Library, Brock University, 1812 Sir Isaac Brock Way, St. Catharines L2T 3G2, Canada



SCIENCE & TECHNOLOGY LIBRARIES
2020, VOL. 39, NO. 3, 253-280
https://doi.org/10.1080/0194262X.2020.1758284



# Information Seeking Behaviors, Attitudes, and Choices of Academic Mathematicians

Ian D. Gordon [a], Brian D. Cameron [b], Debbie Chaves [c], and Rebecca Hutchinson [d]

[a] Liaison Services, Brock University, James A. Gibson Library, St. Catharines, Ontario, Canada [b] Collection Services, Ryerson University Library, Toronto, Ontario, Canada [c] User Services, Wilfrid Laurier University Library, Waterloo, Ontario, Canada [d] Information Services and Resources, University of Waterloo, Davis Centre Library, Waterloo, Ontario, Canada

**ABSTRACT**

Mathematicians in academic institutions utilize a variety of resources and strategies to seek, find, and use scholarly information and news. Using a sample of mathematicians, researchers surveyed 112 students and faculty at four Canadian university institutions to explore self-perceived success rates, resources consulted, databases used, use of social media, and citation management systems. Further, 12 follow-up interviews were completed with mathematicians to better interpret survey results, resulting information-seeking behaviors, choices, strategies, and feelings on keeping up to date with information needs. According to survey results, a minority of mathematicians (12.5 percent) acknowledged that they were successfully keeping up to date. However, a significant number of mathematicians (28.6 percent) indicated that they were unsuccessful and could do better in remaining current with information needs. Co-investigators, using qualitative analyses, identified four emergent themes related to remaining current: (1) The "slower pace of math" pervades all aspects of this discipline;" (2) There are "too many papers – and not enough time" to effectively search, evaluate, and read scholarly papers of interest; (3) Mathematicians collectively acknowledge that they are open to strategies and technologies where they "could do better" keeping up to date; and (4) Mathematicians have divided loyalties using databases when searching for information by means of "MathSciNet in a Google world." Additional insights document how mathematicians are guided by mathematical peculiarities and discipline-specific practices. This study helps to shed light on opportunities for academic librarians to identify and meet mathematicians' evolving information needs.

**KEYWORDS**

Mathematicians, information-seeking behaviors, information needs, information sources, graduate students, faculty, academic (university) libraries, knowledge management

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## Introduction

How do mathematicians seek information, what resources do they consult, how successful are they, what behaviors do they exhibit, and how do they feel about these choices? These questions form the basis of this study as the second of a three-part research project investigating academic chemists (Gordon et al. 2018) and a forthcoming study that will investigate academic physicists. Researchers as academic librarians were also interested to observe idiosyncrasies specific to mathematicians' information seeking while commenting on similarities and differences observed within these scholarly

SCIENCE & TECHNOLOGY LIBRARIES
2022, VOL. 41, NO. 3, 288–318
https://doi.org/10.1080/0194262X.2021.1991546



# Information Seeking Behaviors, Attitudes, and Choices of Academic Physicists

Ian D. Gordon [a], Debbie Chaves [b], Dylanne Dearborn [c], Shawn Hendrikx [d], Rebecca Hutchinson [e], Christopher Popovich [f], and Michael White [g]

[a]Liaison Services, Brock University, James A. Gibson Library, St. Catharines, Ontario, Canada; [b]User Services, Wilfrid Laurier University Library, Waterloo, Ontario, Canada; [c]Physics Library, University of Toronto, Toronto, Ontario, Canada; [d]The D.B. Weldon Library, Western University, London, Ontario, Canada; [e]Davis Centre Library, University of Waterloo, Waterloo, Ontario, Canada; [f]McLaughlin Library, University of Guelph, Guelph, Ontario, Canada; [g]Engineering & Science Library, Queen's University, Kingston, Ontario, Canada

**ABSTRACT**

Physicists in academic institutions utilize a variety of resources and strategies to seek, find, and use scholarly information and news. Using a sample of physicists, researchers surveyed 182 students and faculty at seven Canadian university institutions to explore self-perceived success rates, resources consulted, databases used, and use of social media and citation management systems. To complement the survey, 11 follow up interviews/focus groups were completed with participants to further uncover information-seeking behaviors, choices, strategies, and feelings around keeping up to date with information needs. According to survey results, a minority of physicists (15.4%) acknowledged that they were successfully keeping up to date. However, a significant number of physicists (28.6%) indicated that they were unsuccessful and could do better in remaining current with information needs. Co-investigators, using qualitative analyses, identified four emergent themes: (1) There are "too many papers – and not enough time" to effectively search, evaluate and read scholarly papers of interest; (2) Staying up to date is important especially in competitive research areas; (3) Graduate students seek information differently than faculty and experienced researchers; and (4) The arXiv database is important to many physicists. Additional minor themes included physics-related publishing is constantly evolving; physicists use a variety of information-seeking behaviors; and, information-seeking methods can differ between physics subdisciplines. This study aims to shed light on opportunities for academic librarians to identify and meet physicists' evolving information behaviors, attitudes, choices, and needs.

**KEYWORDS**

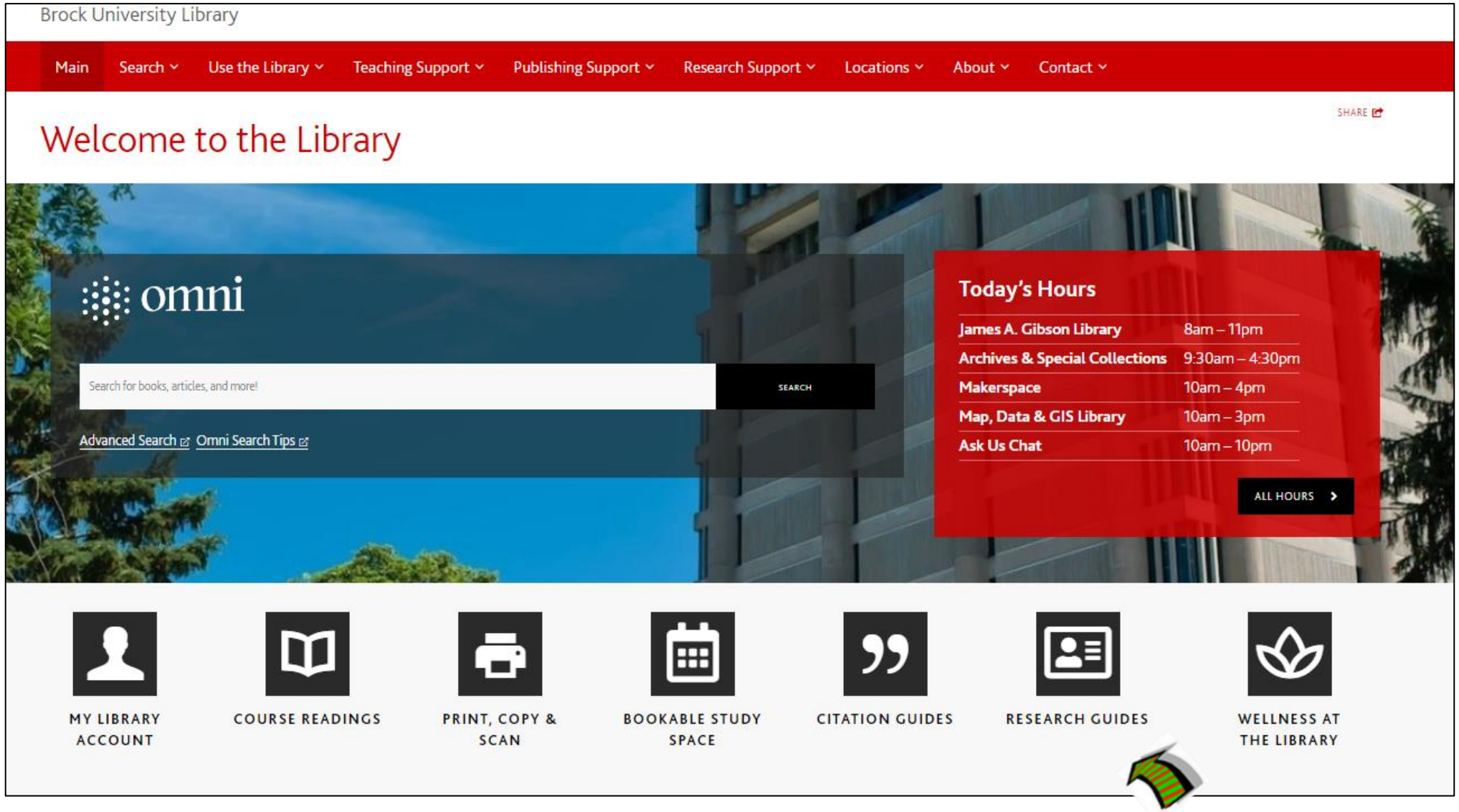
Physicists; information-seeking behaviors; information needs; information sources; graduate students; faculty; academic (university) libraries; knowledge management; information literacy

## Introduction

How do physicists seek information? What resources do they consult? How successful are they? What information-seeking behaviors do they exhibit? How do they feel about these choices? These questions form the basis of this study as

**CONTACT** Ian D. Gordon igordon@brocku.ca Brock University Library, Brock University, 1812 Sir Isaac Brock Way, St. Catharines, Ontario L2S 3A1, Canada

# Identifying your appropriate library research guide(s)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Looking for help with your research? Book a consultation with a librarian.

Book a Consultation

Chemistry



## Need help?

# What's in the Guide

### Welcome to the Chemistry Research Guide!

Typical ways we can help include knowing where to get started, using databases, finding data, getting resources from other academic libraries, and wanting to know how best to find the most important and current research resources when doing a lab, major paper, or theses.

Check out the contacts on this page, in the Help!!! tab, book a consultation or email me directly at igordon@brocku.ca.

ChemDraw software is available to the Brock Community to assist with creating structures and reactions. Cambridge Crystallography Database (WebCSD) is licensed by the Brock Library, but administered by Razvan Simionescu in the Chemistry Department.

Most often used resources in this guide include Omni, Google Scholar, Google Books, Web of Science, SciFinder-n, Brock Chemistry full-text digital Ph.D. dissertations, Biotechnology dissertations, Chemistry M.Sc. theses and Biotechnology theses.

New open databases include Dimensions, CORE, BASE, Paperity, Semantic Scholar, WorldWideScience.org & Zenodo.

ACS Molecule of the Week (and molecule archive!)

CAS Blog on chemistry, science and current events that make the news!

Earth Sciences



## Need help?

## What's in the Guide

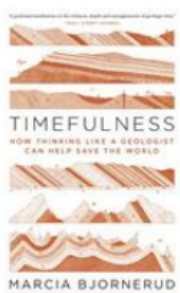
# Welcome to the Earth Sciences Research Guide!

Browse the attached lists of Library article, book, e-book and full-text digital databases and selected Internet web resources.

Check out the Library's Geography Research Guide and Maps, Data & GIS Library Guide for further resources.

Most often used resources in this guide include: Omni, GeoRef, Google Scholar, GeologyOntario, USGS and an assortment of subject-specific encyclopedias, handbooks and guides.

New open databases to the Brock Library include Google Scholar, Dimensions, CORE, BASE, Paperity, SciELO, Semantic Scholar, WorldWideScience.org & Zenodo.




Timefulness: How Thinking Like a Geologist Can Help Save the World (2018)

Mathematics

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HELP!!!

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# Mathematics & Statistics Research Guide

Welcome to the Mathematics & Statistics Research Guide!

My name is Ian Gordon and I am the Liaison Librarian for Mathematics and Statistics. Please browse the adjacent tabs that include lists of Library books, e-books, full-text databases and selected Internet web resources.

Search MathSciNet using the MathSciNet EBSCO interface which allows you to search, cite, push to Zotero, search across fields e.g. titles/subjects/abstracts all at once, create alerts, etc. searching the identical content as the AMS version, just easier to use, try it out.

New databases to the Brock Library include Google Scholar, Dimensions, CORE, BASE, Paperity, SciELO, Semantic Scholar, WorldWideScience.org & Zenodo.

Brock Professor Bill Ralph's Last Lecture Brock Digital Repository resources and Feb 5, 2020 lecture.

Neat Books/ebooks:

Handbook of Writing for the Mathematical Sciences (2020)

101 Careers in Mathematics (2014)

The Mathematical World of Charles L. Dodgson (Lewis Carroll) (2019)

Loving and Hating Mathematics Challenging the Myths of Mathematical Life (2011)

5 Steps to a %: 500 AP Statistics Questions to Know by Test Day (2020)

McGraw-Hill Education Top 50 Skills for a Top Score: SAT Math (2015)

What is/are your most appropriate library research guide(s)?

# Search strategies and keywords

How successful are chemists, mathematicians, and physicists in keeping up to date with news and scholarly information in their field of study?

What are the key search concepts?

How successful are chemists, mathematicians, and physicists in keeping up to date with news and scholarly information in their field of study?

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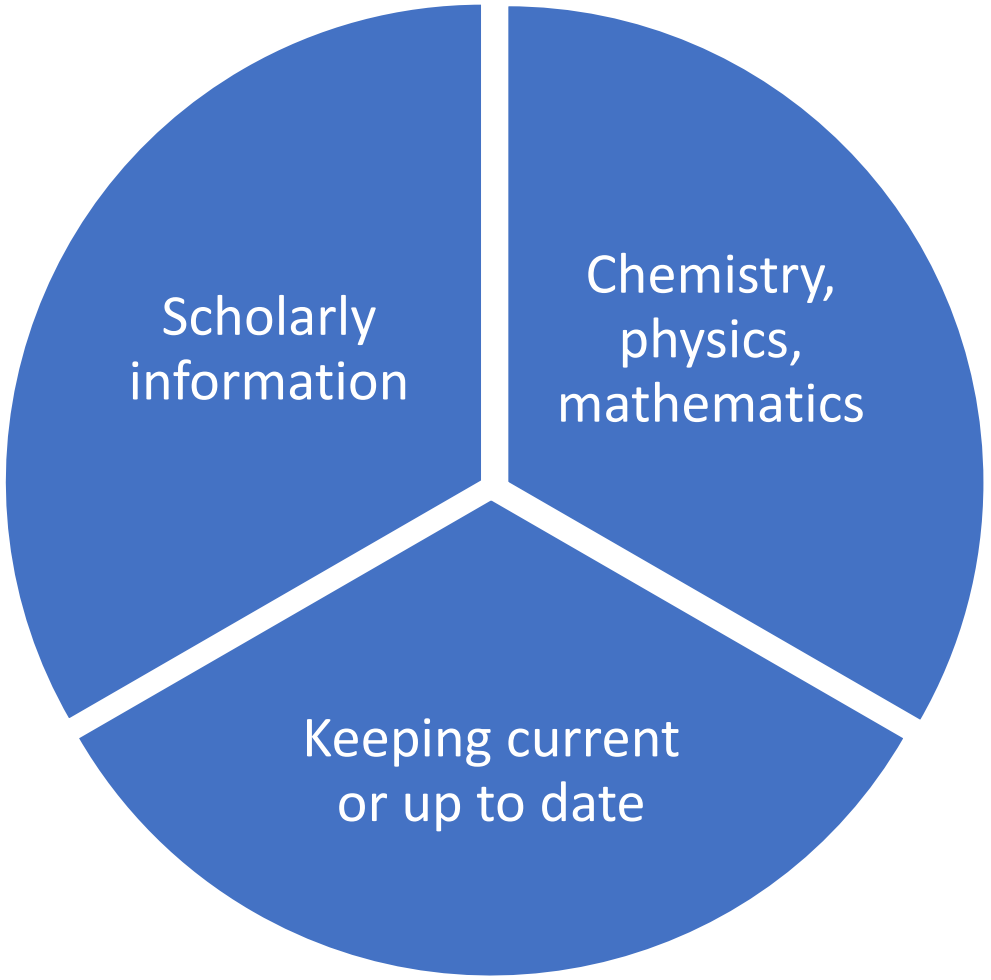
How successful are chemists, mathematicians, and physicists in keeping up to date with news and scholarly information in their field of study?



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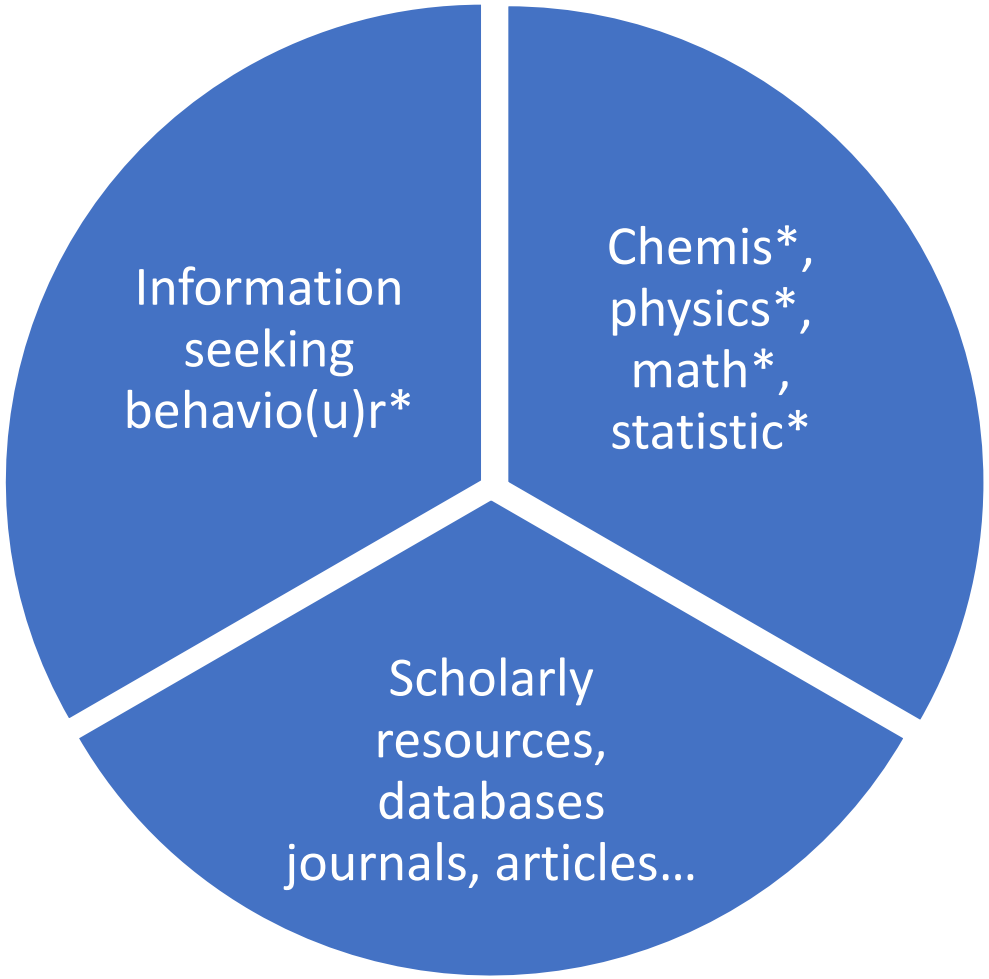

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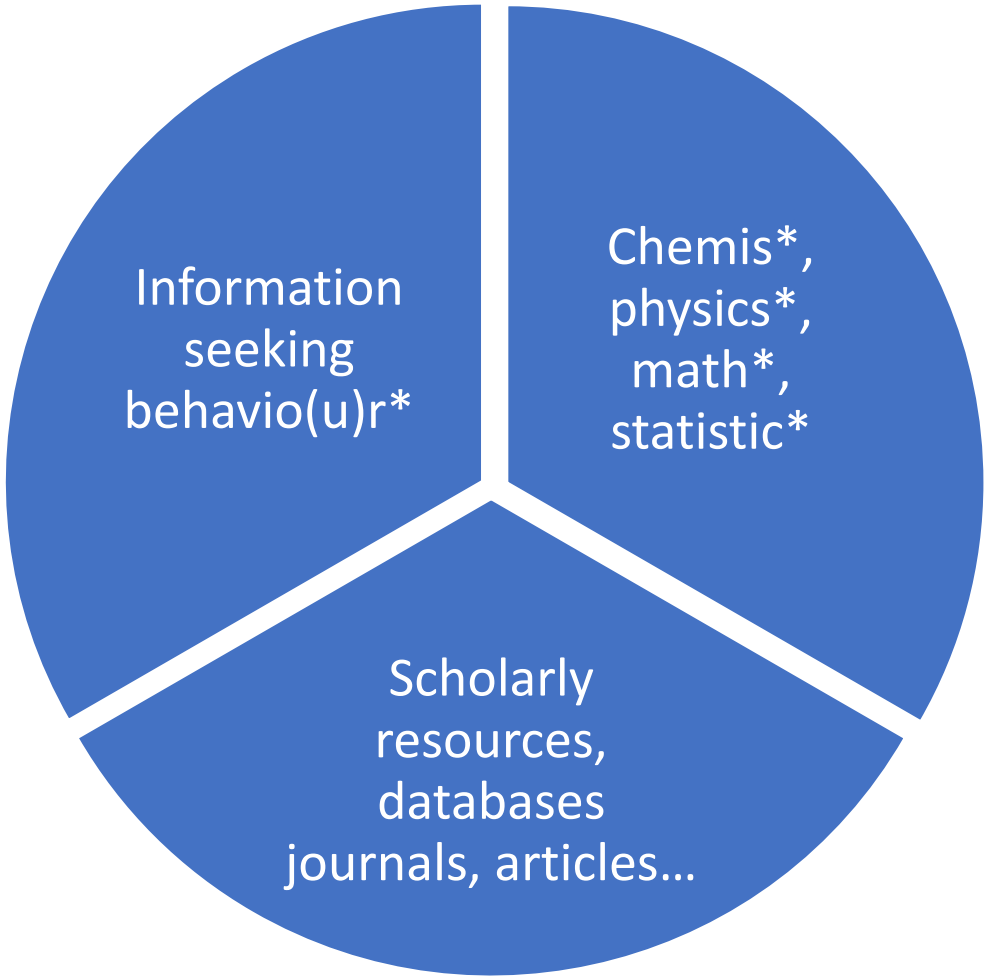


Currency of information
Language
Discipline
Format

My professor and research team

How successful are chemists, mathematicians, and physicists in keeping up to date with news and scholarly information in their field of study?

1. “information w/3 seeking”

AND

2. behavior* or behaviour*

AND

3. chem* or physics or physicist* or math* or statisti*

Language = English AND
Date = 2000+ AND
Format = peer reviewed scholarly journal articles

# Databases – lots of them

Neuroscience

HOME

What's In The Guide

ARTICLES

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WEBSITES

INTERLIBRARY LOAN / RACER

WRITING & CITING

HELP!!!

## Need help?

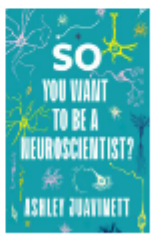
# What's in the Guide

Welcome to the Neuroscience Research Guide!

My name is Ian Gordon and I am the Teaching & Learning Librarian for Neuroscience. Please browse the attached lists of often used and most popular Library databases, books, e-books, full-text databases and selected Internet web resources. Note other library subject guides and additional resources:

Psychology / Health Sciences / Chemistry / Biological Sciences

New and alternate databases to the Brock Library include Google Scholar, Dimensions, CORE, BASE, Paperity, SciELO, Semantic Scholar, scite, WorldWideScience.org & Zenodo.




So You Want To Be A Neuroscientist? (2020)

So You Want to Be a Neuroscientist? is a contemporary and engaging guide for aspiring neuroscientists of diverse backgrounds and interests. Fresh with the experience of having recently launched her own career, Ashley Juavinett provides a candid look at the field, offering practical guidance that explores everything from programming to personal stories.

Neuroscience

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Need help?

Ask

# Neuroscience Databases

The best place to find journal articles is in a database. Compare search results using the following recommended databases.

New and alternate databases to the Brock Library include Google Scholar, Dimensions, CORE, BASE, Paperity, SciELO, Semantic Scholar, & Zenodo.

A full list of neuroscience databases can be found here.

- Omni
  A powerful multidisciplinary tool. It includes content from the Brock library catalogue, digital repository, most databases (including Academic Search Complete), JSTOR, Web of Science, and journal article citations from many scholarly publishers.
- Google Scholar Open Access Alumni Access
- Web of Science Core Collection
  Searches for articles in core science, neuroscienc
  *more info...*
- Web of Science Complete
  Searches for articles in Web of Science Core, BIO
- MEDLINE - via Web of Science Complete
  Searches for articles in core applied health and n
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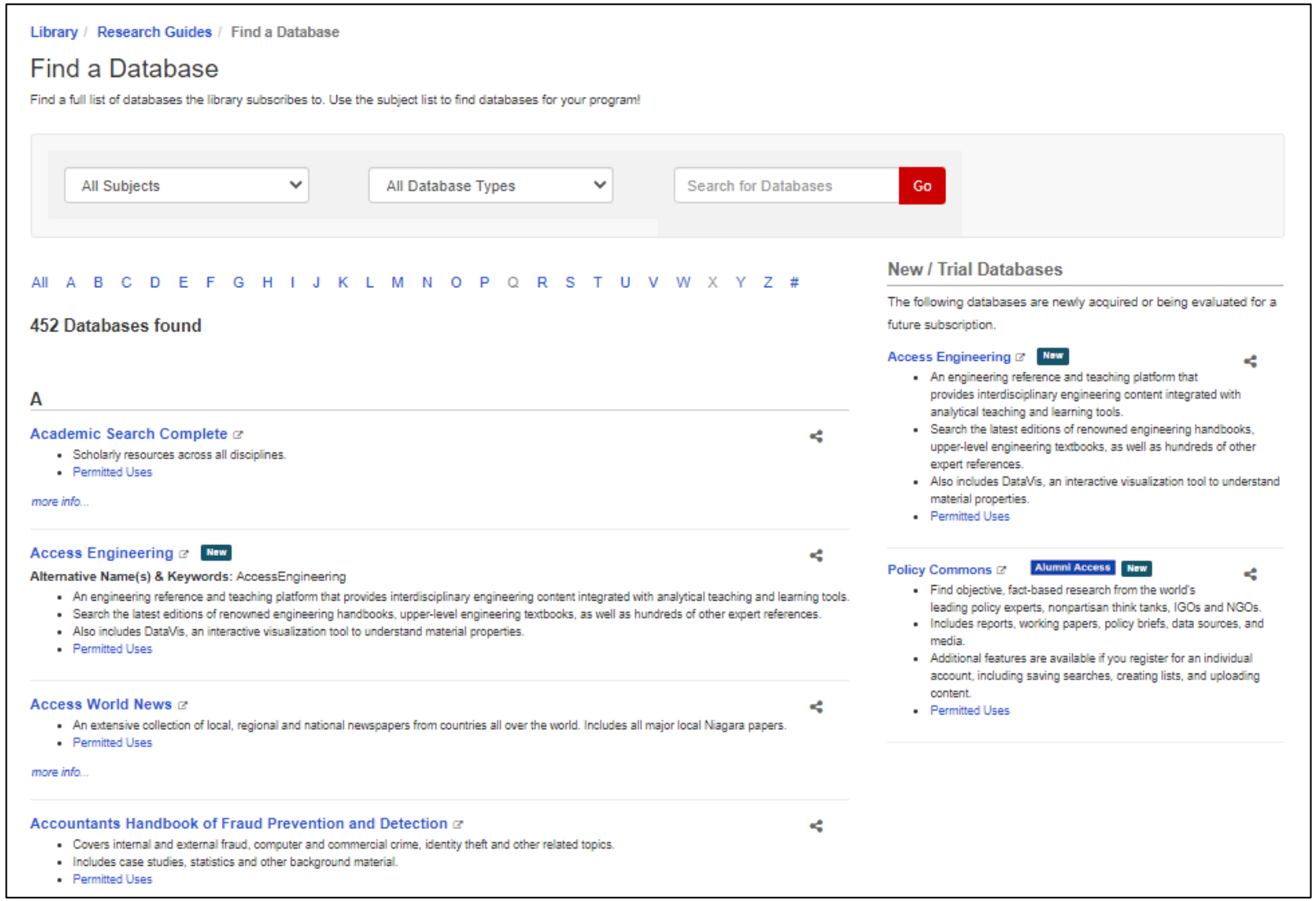

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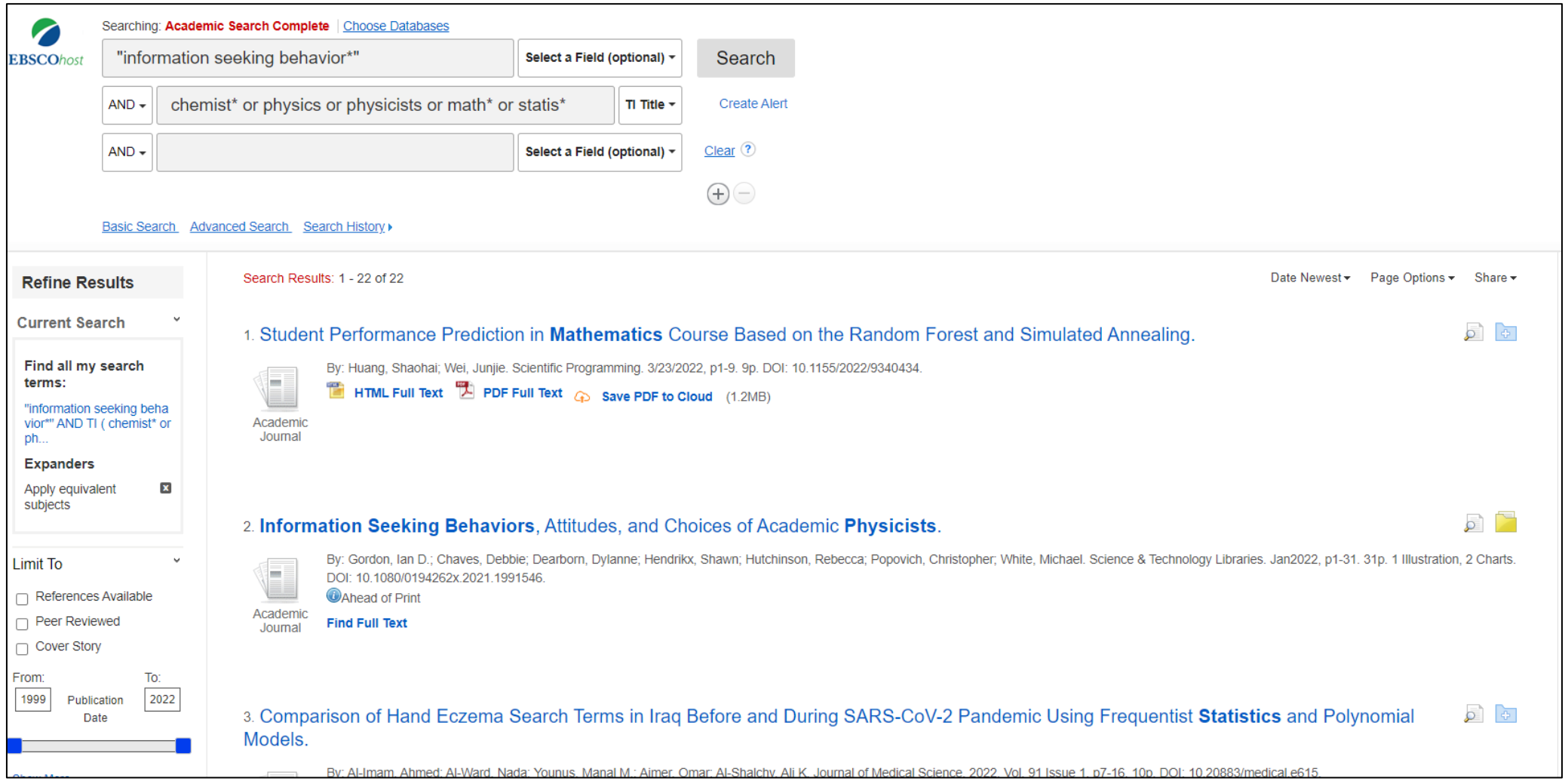
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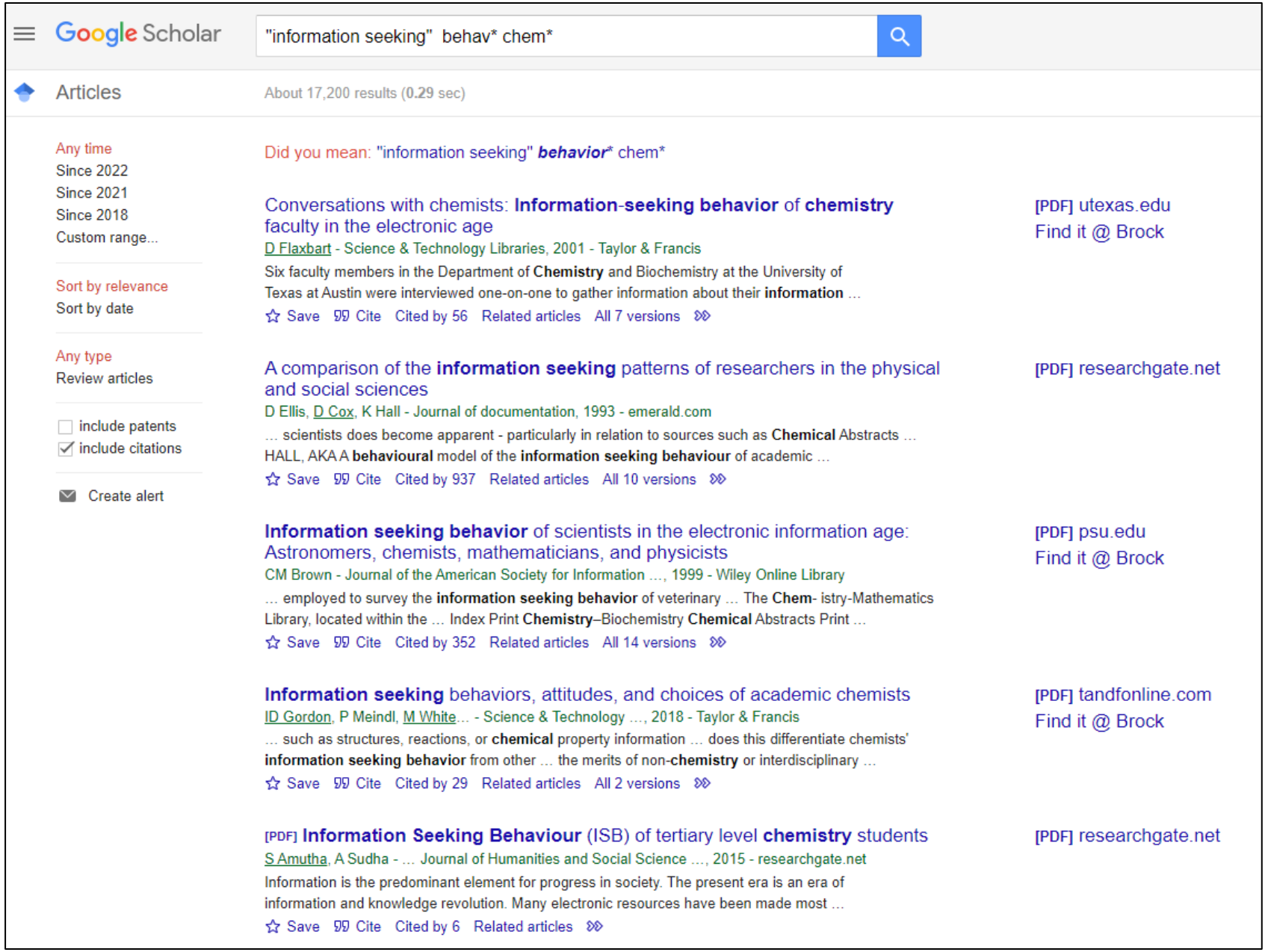
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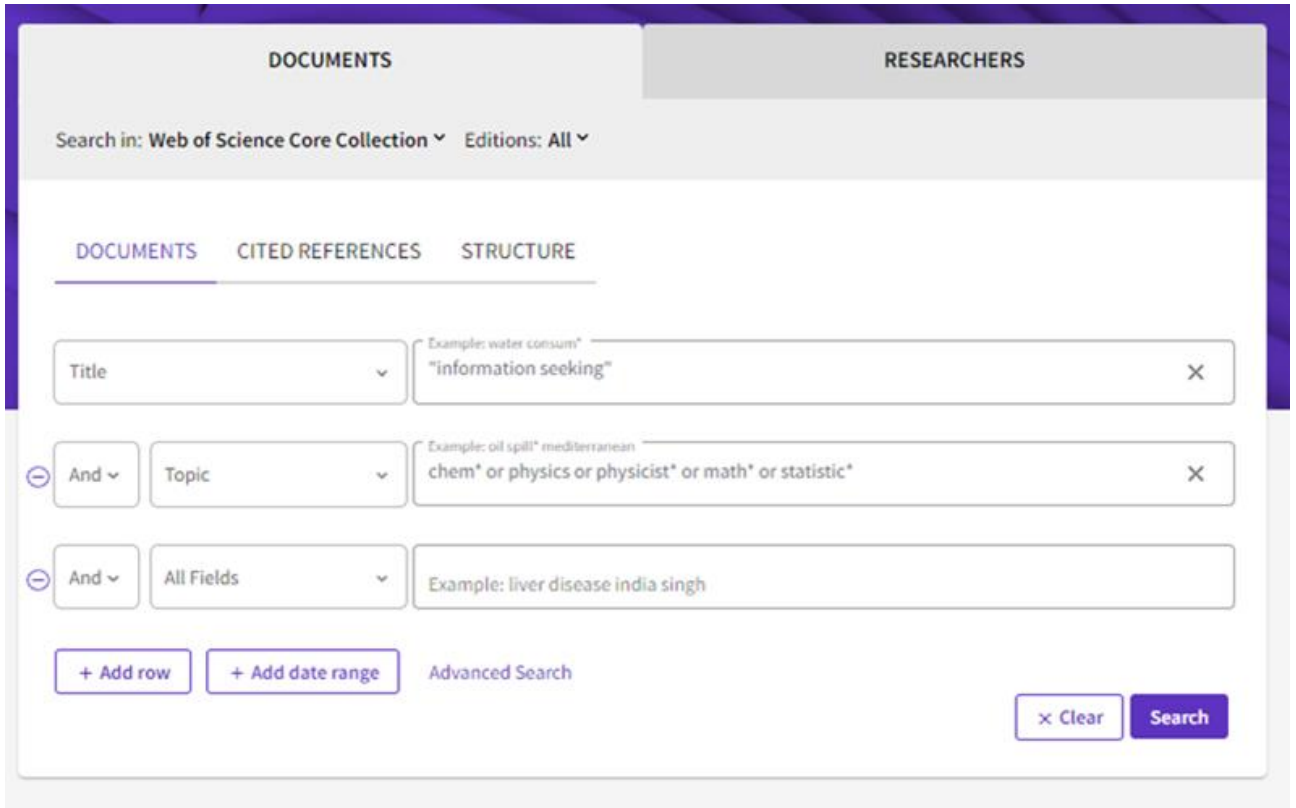

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Citizens are increasingly using Internet-based resources to obtain and understand health information at the point of need. The ability to locate, evaluate and use online health information may be influenced by an individual's level of health literacy and eHealth literacy. Those with advanced eHealth literacy skills may utilise more efficient online search strategies and identify higher quality health information resources. This paper describes a study which investigated the associations between health literacy, eHealth literacy and actual online health information seeking behavior. Accurately quantifying online health information seeking behavior can be difficult, which is why we integrated software into the web browser to objectively monitor online interactions, search queries and Uniform Resource Locators. We recruited 54 participants to search for information related to common health topics. We received 307 answers, of which 75.2% were correct. However, despite having adequate health and eHealth literacies, participants relied on search engine results as a guide to locating information resources. Furthermore 96.3% of participants utilised unaccredited health information to answer some questions. The findings suggest that eHealth literate individuals may not always utilise effective online searching strategies. Pearson's product-moment correlation indicated that the relationship between the health and eHealth literacy scores was not statistically significant. (C) 2016 Elsevier Ltd. All rights reserved.

## Keywords

**Author Keywords:** Health literacy; eHealth literacy; Online health information seeking behavior
**Keywords Plus:** UNCERTAINTY MANAGEMENT; INTERNET USE; COMMUNICATION; CARE; CHILDREN; STUDENTS; PARENTS; SUPPORT; WEB; HIV

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Susan Quinn*, Raymond Bond, Chris Nugent

*School of Computing and Mathematics, University of Ulster, Newtownabbey, County Antrim, UK*

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ABSTRACT

Citizens are increasingly using Internet-based resources to obtain and understand health information at the point of need. The ability to locate, evaluate and use online health information may be influenced by an individual's level of health literacy and eHealth literacy. Those with advanced eHealth literacy skills may utilise more efficient online search strategies and identify higher quality health information resources. This paper describes a study which investigated the associations between health literacy, eHealth literacy and actual online health information seeking behavior. Accurately quantifying online health information seeking behavior can be difficult, which is why we integrated software into the web browser to objectively monitor online interactions, search queries and Uniform Resource Locators. We recruited 54 participants to search for information related to common health topics. We received 307 answers, of which 75.2% were correct. However, despite having adequate health and eHealth literacies, participants relied on search engine results as a guide to locating information resources. Furthermore 96.3% of participants utilised unaccredited health information to answer some questions. The findings suggest that eHealth literate individuals may not always utilise effective online searching strategies. Pearson's product-moment correlation indicated that the relationship between the health and eHealth literacy scores was not statistically significant.



## 1. Introduction

Health information seekers are increasingly using online health information to answer health related questions. The Pew Research Center's Internet and American Life Project indicates that health information seeking was the third most popular online activity measured (Fox, 2011) and that 72% of Internet users have used the world wide web to search for health information (Fox & Duggan, 2013). The Internet provides a convenient, cost effective and private means of gaining access to health knowledge, and the motivations for seeking information are diverse. Health information seekers have used the Internet as a diagnostic tool, sought information about specific treatments and looked for others with a similar health concern (Fox & Duggan, 2013). Individuals seek health information for a number of reasons, including (1) reassurance, (2) to reduce uncertainty, or (3) to help reconcile themselves with a new health situation (Caiata-Zufferey, Abraham, Sommerhalder, & Schulz, 2010; Powell, Inglis, Ronnie, & Large, 2011; Strekalova, 2016). However, doubts have been raised about the quality, accuracy, reliability and veracity of various online health information resources (Zhang, Sun, & Xie, 2015). Moreover, there are concerns that not all health information seekers will have sufficient skills to appraise the quality of online health information (Chen & Lee, 2014). Health Literacy is an individual's competence to obtain, understand and apply health information (Sørensen et al., 2012). The capabilities associated with health literacy include reading and writing skills, listening and speaking skills, numeracy skills, and cultural and conceptual knowledge (Sørensen et al., 2012). Additional capabilities include advanced cognitive skills that, along with social skills, can enable an individual to critically analyse information (Nutbeam, 2000). Inadequate health literacy has been linked to negative health practices including a lack of use of disease prevention services, poorer health and increased hospitalisations (Jacobs, Lou, Ownby, & Caballero, 2016; World Health Organization, 2013). In the sphere of online health information seeking, low health literacy has been associated with a limited

* Corresponding author.
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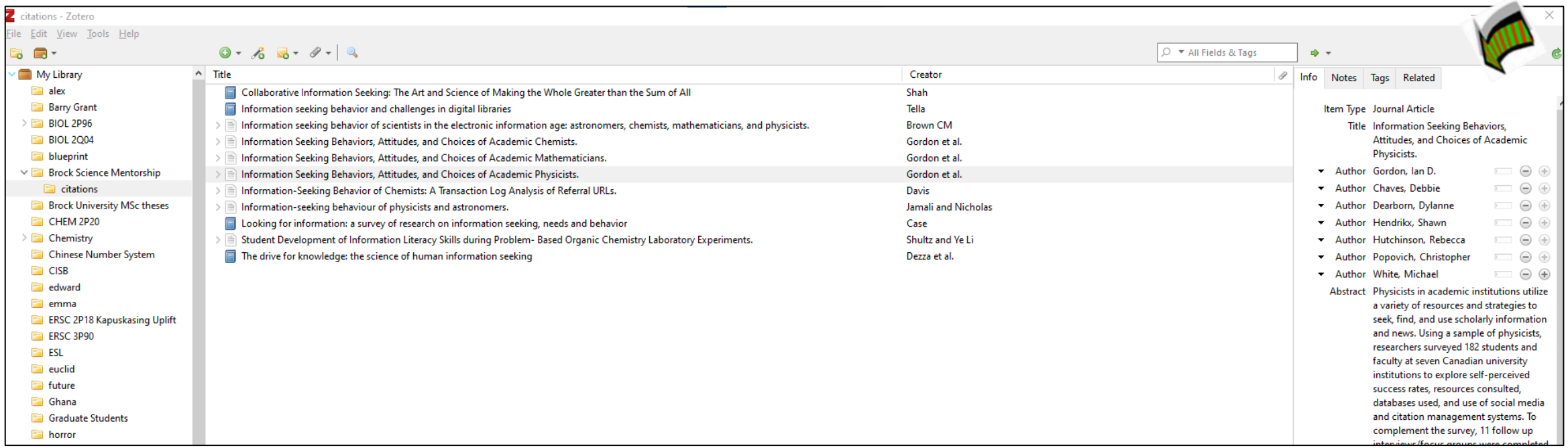
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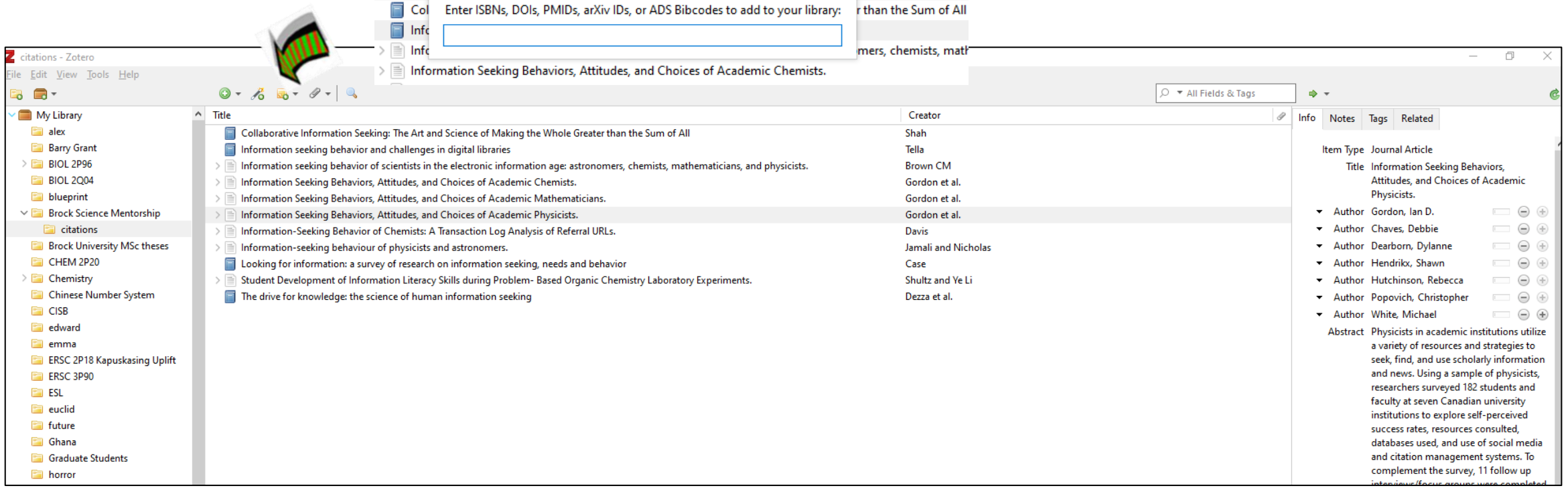
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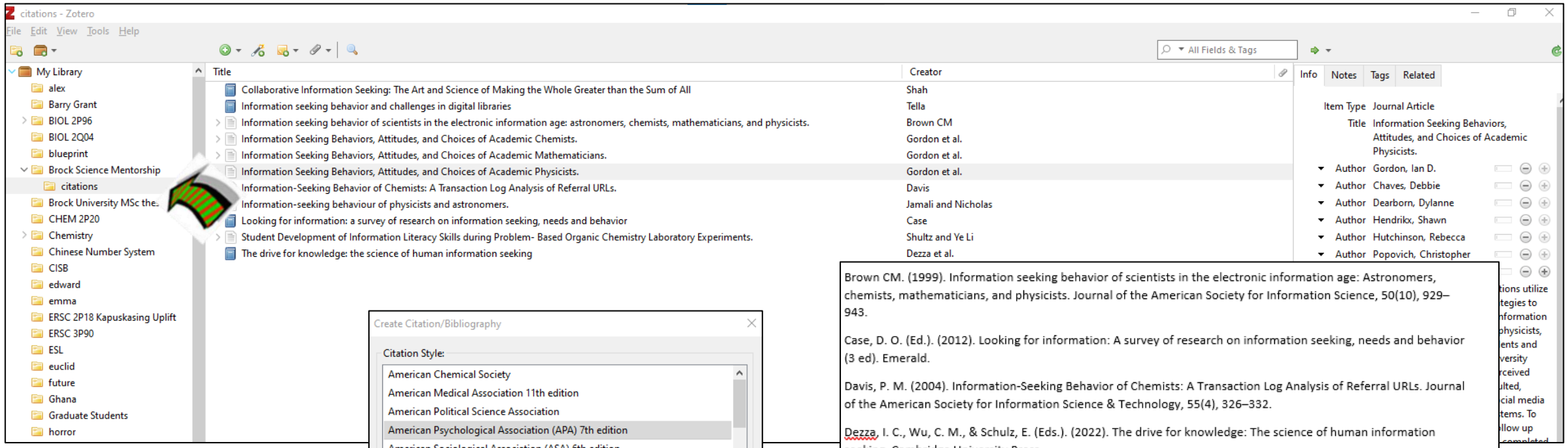


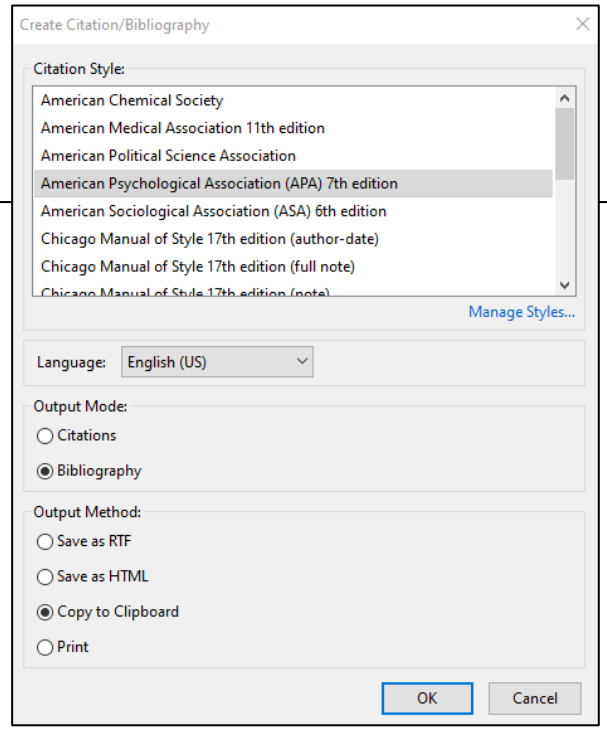




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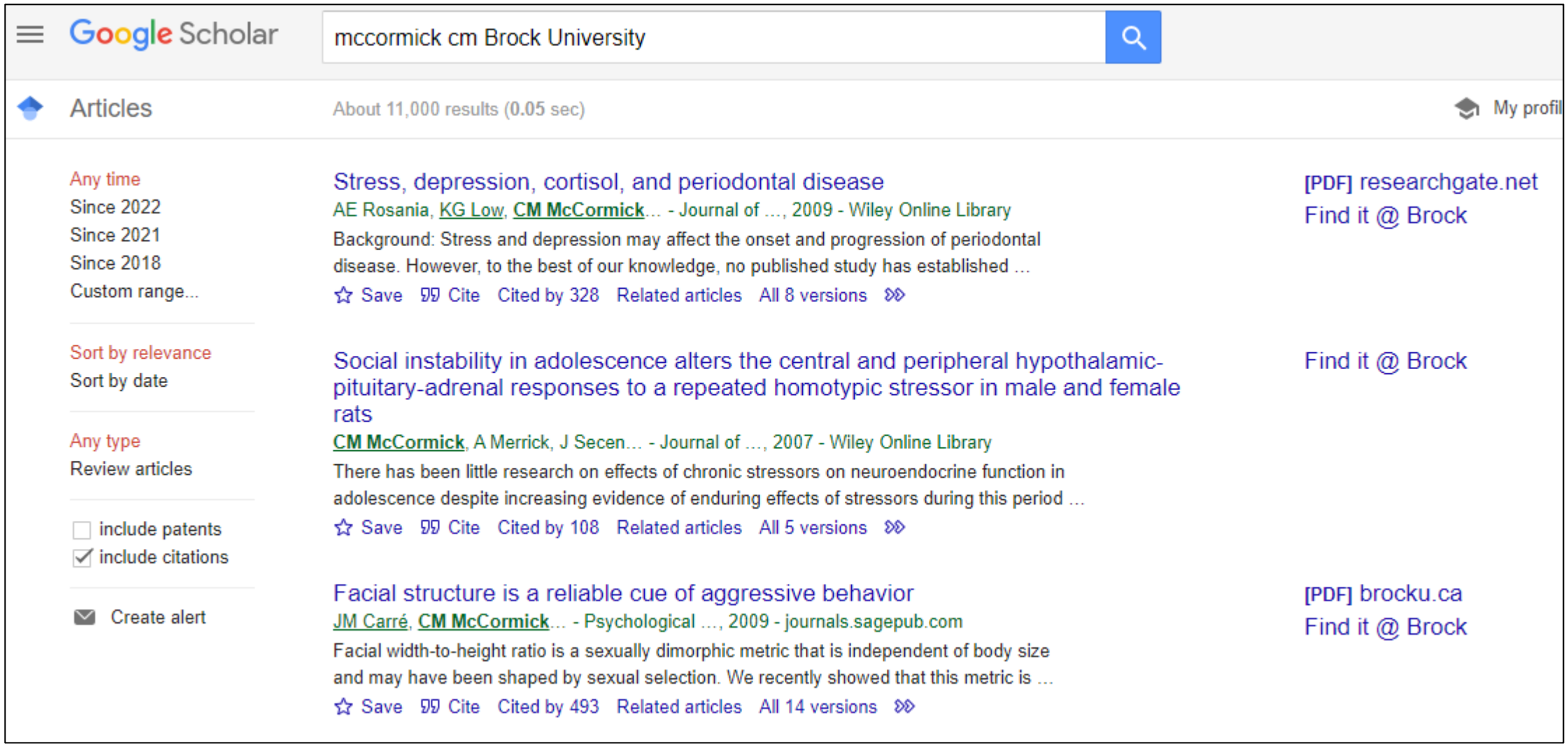
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Volume 80 • Number 2

# Stress, Depression, Cortisol, and Periodontal Disease

Amy E. Rosania,* Kathryn G. Low,* Cheryl M. McCormick,† and David A. Rosania‡

**Background:** Stress and depression may affect the onset and progression of periodontal disease. However, to the best of our knowledge, no published study has established whether the mechanisms by which stress and depression influence periodontal disease are physiologic, behavioral, or both. This cross-sectional pilot study explored the associations between psychologic factors, markers of periodontal disease, psychoneuroimmunologic variables, and behavior.

**Methods:** This study included 45 periodontal patients referred by three dentists. Participants completed composite health, chronic stress, depression, and demographic questions, and salivary cortisol (CORT) was measured. A hygienist assessed the magnitude of periodontal disease.

**Results:** Stress, depression, and CORT were correlated with measures of periodontal disease. In addition, oral care neglect during periods of stress and depression was associated with attachment loss and missing teeth. After controlling for age, family history, and brushing frequency, depression and CORT were significant predictors of the number of missing teeth. A similar model also predicted the number of teeth with clinical attachment loss >5 mm.

**Conclusions:** Stress and depression may be associated with periodontal destruction through behavioral and physiologic mechanisms. Addressing psychologic factors, such as depression, may be an important part of periodontal preventive maintenance. *J Periodontol 2009;80:260-266.*

KEY WORDS

**Cortisol; depression; periodontal disease; stress.**

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Periodontal disease is one of the most common causes of tooth loss. Systemic risk factors, such as diabetes mellitus, cigarette smoking, age, and genetic factors, influence the onset and progression of periodontal disease.[1] Research has also suggested that stress, depression, and ineffective coping may contribute to the development of periodontitis.[2] However, the mechanism by which stress affects periodontal health remains unclear. One model proposes that psychologic stress may result in immunologic and inflammatory responses that influence periodontal disease, whereas an alternative model hypothesizes that negative affective states may reduce compliance with preventive behaviors.[3] Evaluation of these potential mechanisms may inform treatment for patients with stress or depression and periodontal disease.

### *Periodontal Disease*

Gingivitis is a mild, reversible form of periodontal disease characterized by gingival inflammation without attachment loss and detected clinically by bleeding on probing. Untreated gingivitis may evolve into periodontitis, a chronic inflammatory state resulting in periodontal attachment loss.[2] Clinical indicators of periodontitis include probing depth (PD), recession (REC), clinical attachment level (CAL; CAL = REC + PD), and radiographic loss of alveolar bone.[4]

Like many chronic diseases, the development of periodontal disease may also be related to conditions that alter

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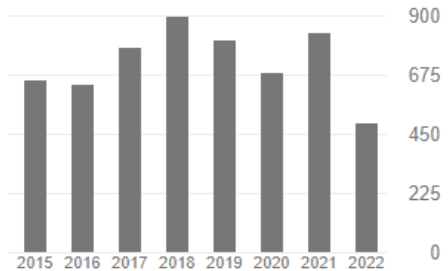


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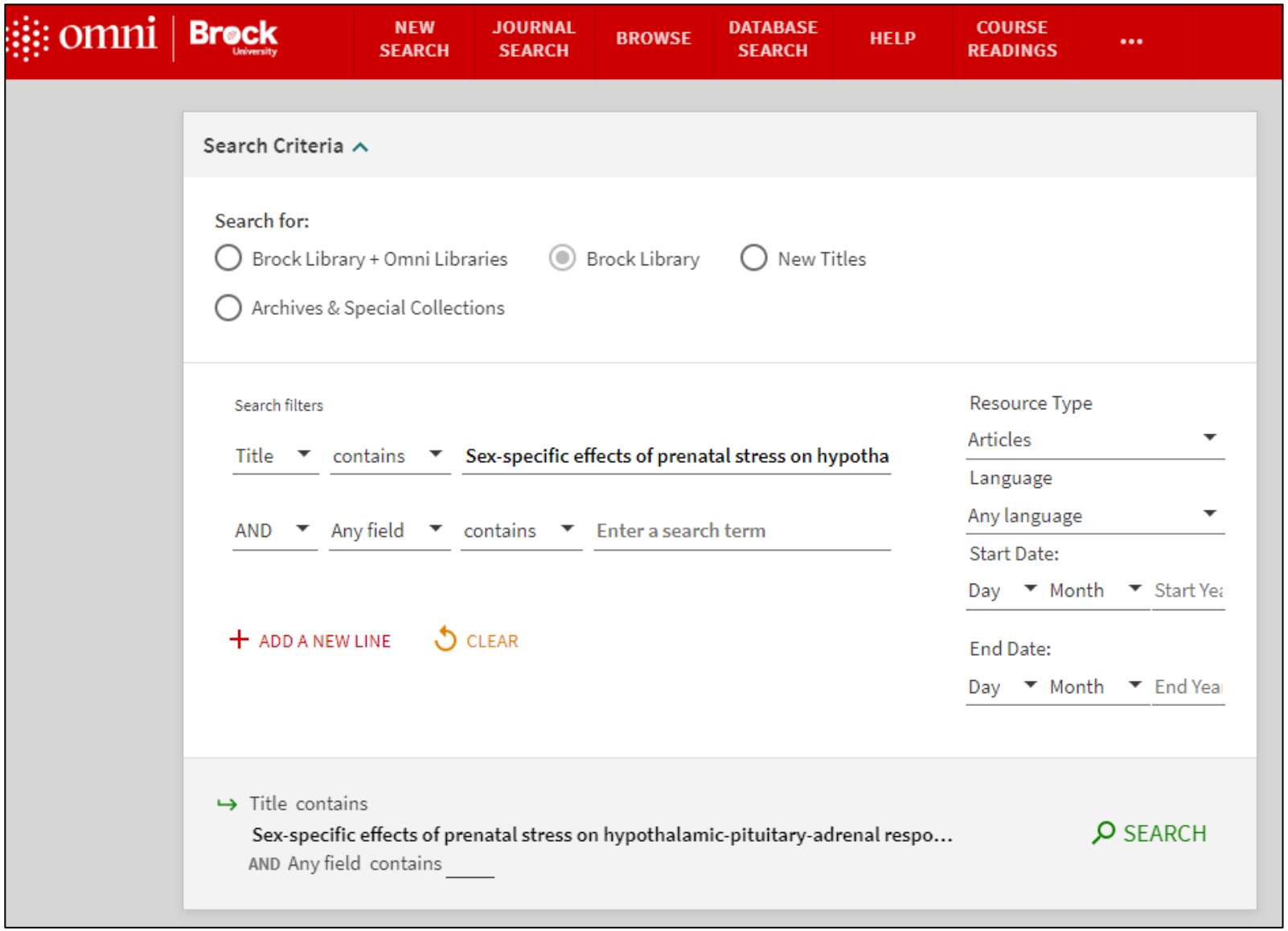
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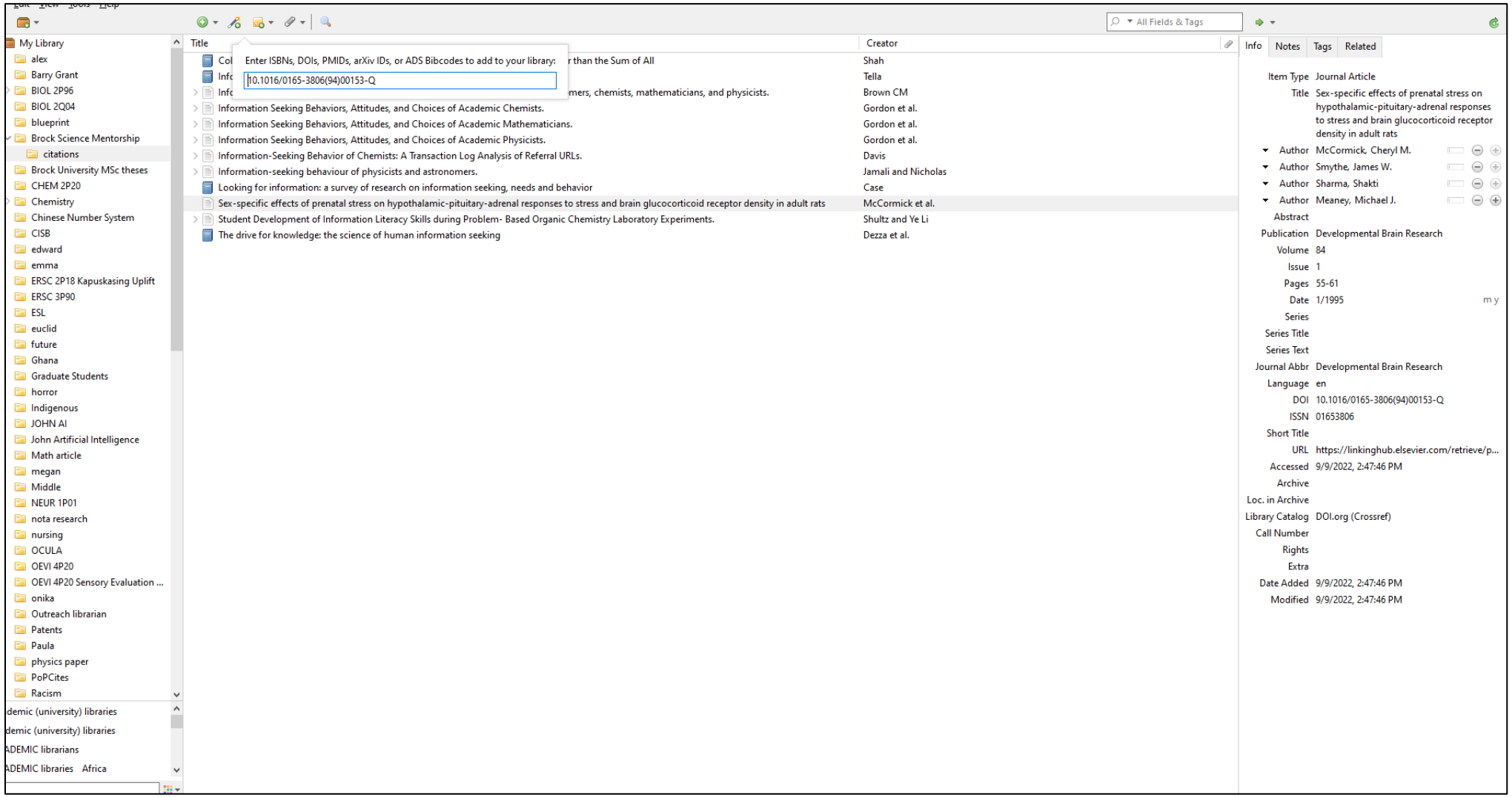
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DEVELOPMENTAL BRAIN RESEARCH

Research report

# Sex-specific effects of prenatal stress on hypothalamic-pituitary-adrenal responses to stress and brain glucocorticoid receptor density in adult rats

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Accepted 16 August 1994

**Abstract**

Previous research indicates that the offspring of dams exposed to stress during late gestation show altered hypothalamic-pituitary-adrenal (HPA) responses to stress. However, the results are inconsistent and a review of the literature suggests that the effects may differ depending upon the gender of the offspring. In the present study, we measured plasma adrenocorticotropin (ACTH) and corticosterone (B) levels prior to, and at 0, 20, 40 and 70 min following restraint stress in catheterized adult male and female offspring of dams stressed in the last week of gestation (i.e. days 15–19 of gestation). Prenatal stress significantly increased both plasma ACTH and B levels in response to restraint, but only in females; male offspring were largely unaffected. In addition, plasma corticosteroid-binding globulin (CBG) levels were significantly increased in prenatally-stressed females, but not in males. Despite these differences in plasma CBG, estimated free B levels following restraint were also significantly elevated in prenatally-stressed females. We then examined glucocorticoid receptor binding in a variety of forebrain structures. Prenatal stress had no effect on glucocorticoid receptor density in the hypothalamus or hippocampus in either males or females. Differences in glucocorticoid receptor density across groups were observed in the septum, frontal cortex, and amygdala. However, the pattern of observed differences across the groups was not consistent with the pattern of hormonal differences. In summary, the effect of prenatal stress on HPA function is substantially more marked in females than in males. Interestingly, a similar pattern of effects on HPA activity has been reported for prenatal alcohol exposure.

*Keywords:* Stress; Corticosterone; Adrenocorticotropin; Glucocorticoid receptors; Corticosterone binding globulin; Sex differences; Prenatal stress

## 1. Introduction

Prenatal stress appears to alter both behavioral and endocrine responses to stressful stimuli in the rat, although the data bear some inconsistencies. Adult prenatally-stressed animals differ from control animals in behavioral responses to threat in a manner that is generally consistent with the idea of heightened responsivity to stress in the prenatally-stressed animals (e.g. decreased ambulations in open field compared to controls [20,30]; increased defensive freezing and vocalizations [26]). However, the behavioral findings often appear to depend upon the gender of the animal (e.g. [30]). Studies on the effects of prenatal stress on neuroendocrine responses to stress provide a more ambiguous story. At day 14 of life, prenatally-stressed pups show higher resting and stress levels of adrenocorticotropin (ACTH) and corticosterone (B) compared to controls [23,24]. Basal ACTH levels of prenatally-stressed female pups tend to be higher than that of prenatally-stressed males, although they do not differ from males in resting plasma B levels [23]. There are conflicting reports on adult hypothalamic-pituitary-adrenal (HPA) function in prenatally-stressed animals. Pollard [20] found a slight reduction in B

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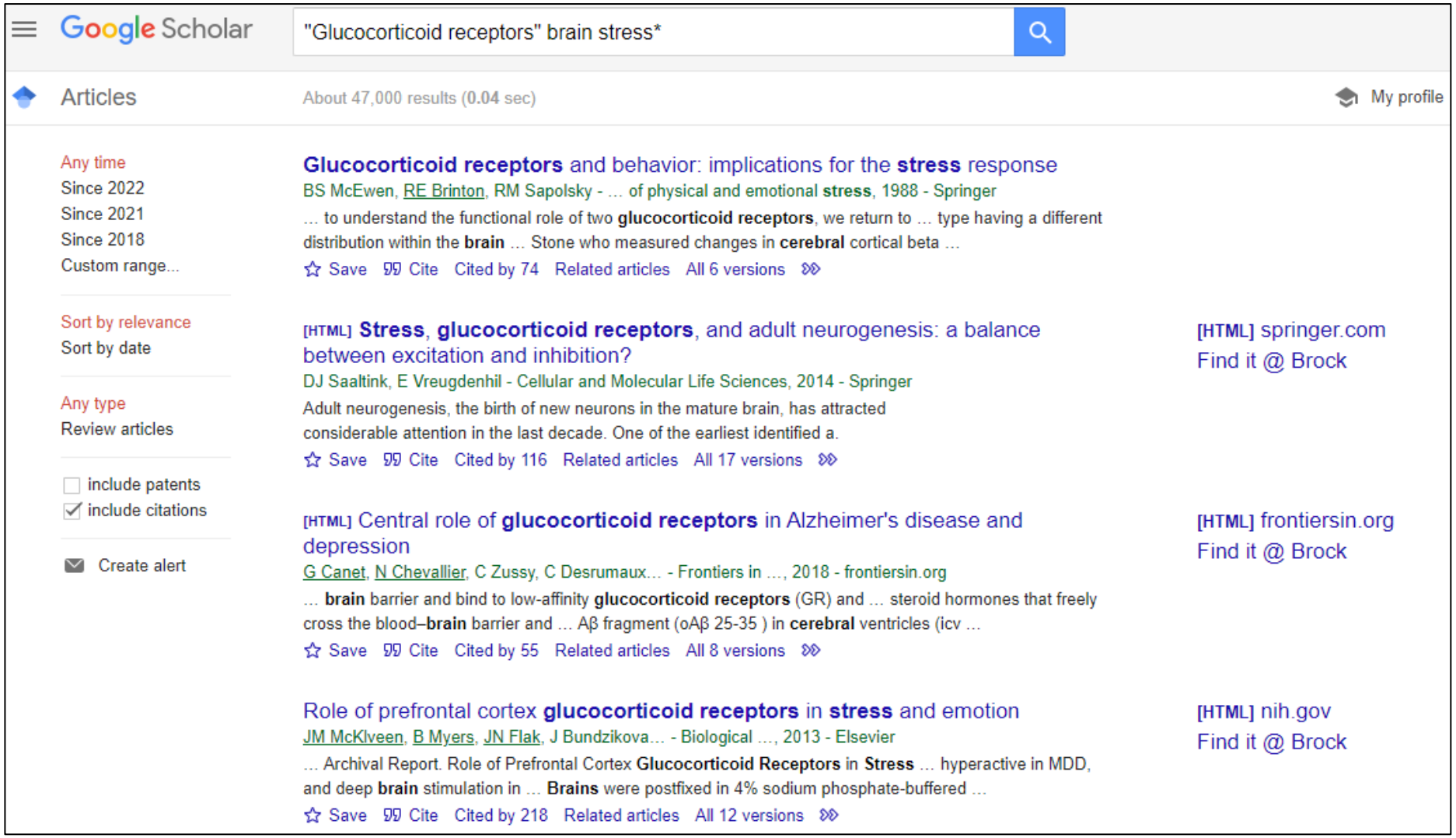
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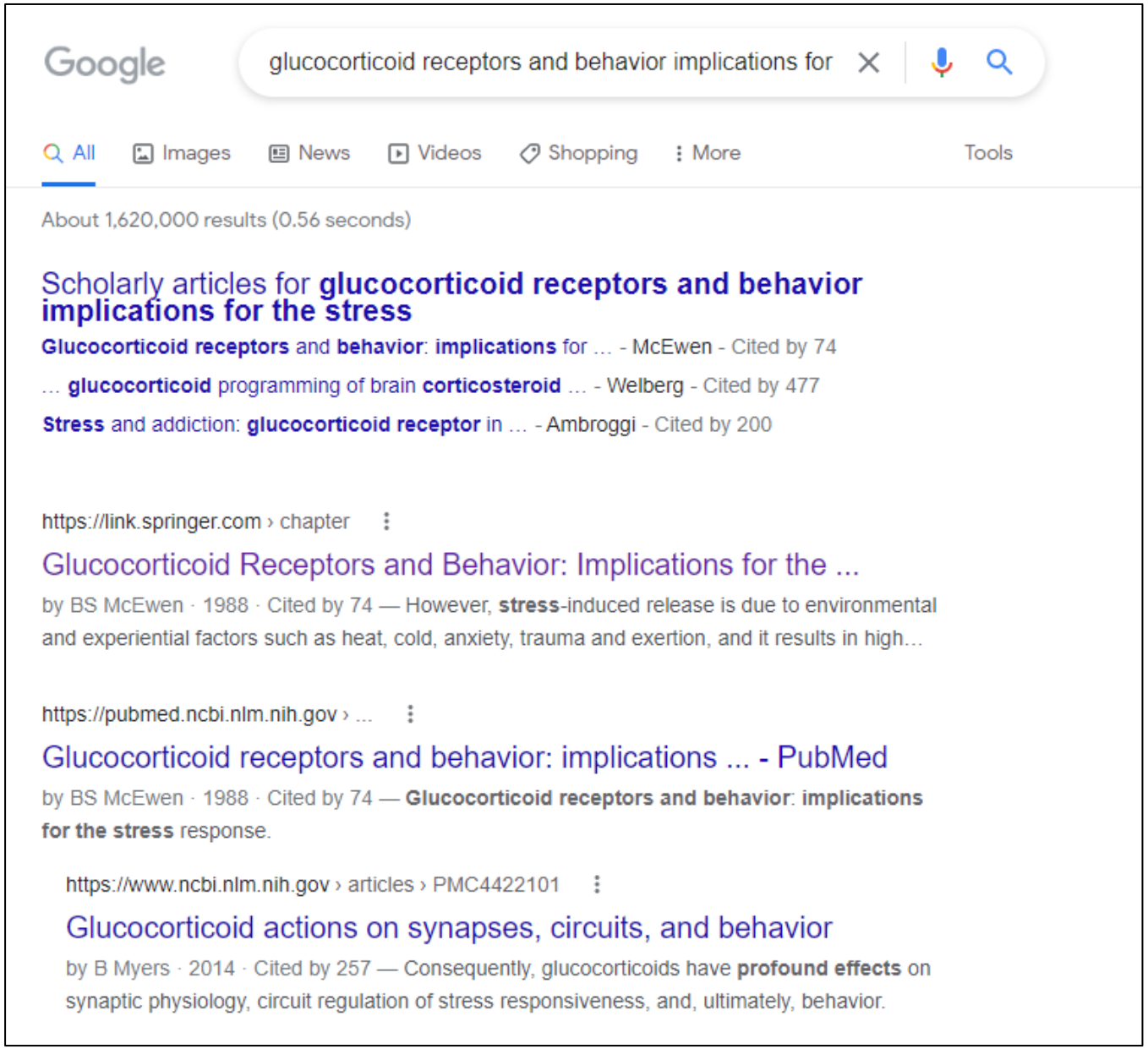
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Bruce S. McEwen, Roberta E. Brinton & Robert M. Sapolsky

Chapter

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Part of the Advances in Experimental Medicine and Biology book series (AEMB,volume 245)

## Abstract

Stress-induced release of glucocorticoids is one of two modes of operation of the pituitary-adrenal axis, the other being the diurnal variation of glucocorticoid levels. Both operating modes are, of course, driven by CNS release of the releasing factor, CRH, in combination with other modulators such as vasopressin and oxytocin (Vale, this volume; Plotsky, this volume; (1)). However, stress-induced release is due to environmental and experiential factors such as heat, cold, anxiety, trauma and exertion, and it results in high levels of glucocorticoids in the blood. On the other hand, diurnal variation in pituitary-adrenal function is based upon an endogenous oscillator (2), although both the light-dark cycle and the anticipation of food entrain the rhythm (3, 4).

## Keywords

**Glucocorticoid Receptor** **Gonadal Steroid** **Adrenal Steroid** **Neonatal Handling** **Repeat Restraint Stress**

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- Where to get help

- Homework!

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